7

Eye Movement Desensitization and Reprocessing

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Eye movement desensitization and reprocessing (EMDR), an emerging therapy for psychological trauma, has been in use for nearly a decade. Although it has stimulated strong interest and enthusiasm, EMDR has also received intense critical scrutiny. This chapter provides an overview of the history and theory of EMDR. Next, the EMDR procedure is summarized, followed by a review of the outcome literature. Dismantling studies of the contribution of eye movements to the efficacy of the EMDR procedure are then reviewed, followed by an overall rating reflecting the current knowledge of EMDR's efficacy, along with recommendations for its use. The chapter concludes with suggestions for further research.

HISTORY AND DEVELOPMENT OF EMDR

Rather than having been generated from a specific theoretical position, EMDR originated in a serendipitous observation by Dr. Francine Shapiro in 1987. In her book, Shapiro (1995) described how she noticed during a walk that back-and-forth movements of her eyes were associated with reductions in the aversiveness of troublesome thoughts. In a first attempt to test the therapeutic effect of eye movements on "traumatic memory symptomatology," Shapiro formulated a desensitization procedure that included asking trauma survivors to think of a troublesome thought or memory while tracking her

fingers as she moved them back and forth across the individual's visual field. Participants reported that during the procedure, their thoughts became less distressing. The report of this first experience with "eye movement desensitization" (EMD) created considerable interest (Shapiro, 1989). Shapiro subsequently changed the procedure's name to "eye movement desensitization and reprocessing" (EMDR) to reflect an increased emphasis on fostering cognitive and emotional changes in the participant through a more highly developed procedure.

EMDR THEORY

EMDR theorists characterize EMDR as an integrative treatment informed by such diverse concepts as network theories of emotion (Lang, 1979) and of PTSD (Chemtob, Roitblat, Hamada, Carlson, & Twentyman, 1988; Foa, Steketee, & Rothbaum, 1989), dissociation (Janet, 1973), mood-dependent learning (Bower, 1981), assimilation and accommodation (Piaget, 1950), nonverbal representation of traumatic memories (van der Kolk, 1994), incorporation of corrective information (Foa & Kozak, 1986), and the "tendency to completion" from Horowitz's (1976) seminal analysis of information processing in trauma. EMDR theorists regard their treatment as incorporating a dynamic view of information processing that is consistent with newer models of learning and cognition, including connectionist theories.

Shapiro (1995) has proposed an "accelerated information-processing" model to account for the resolution of traumatic memories. The model includes the following key propositions:

1. Traumatization entails interference with psychological and biological processes that normally promote adaptation to memories of events. Traumatic memories are at least partially dissociated from the broader semantic–affective network and represented in a "state-dependent" form. This leads to distortions in perception, feeling, and response.

2. An intrinsic self-healing mechanism exists within people that when activated reintegrates traumatic memories into a normalized form. Conjugate eye movements (or other stimulation such as tone or taps) performed within the context of the EMDR procedure activate this self-healing mechanism. A number of hypotheses have been proposed to account for the possible contribution of such stimulation (for a review, see Shapiro, 1999).

3. Information about self–other attributions is encoded along with cognitive, affective, and physiological response elements. Self-representations play a key role in preserving the distortions inherent in traumatic memories.

4. In cases of multiple traumatization, EMDR treatment dosage is determined by the number of traumatic memories to be accessed and resolved. Sometimes, but not always, these memories can be grouped thematically.

THE EMDR PROCEDURE

EMDR treatment requires the patient to identify multiple aspects of the traumatic memory, including the images associated with the event, the affective and physiological response elements, the negative self-representation induced by the traumatic experience, and an alternate, desired, positive self-representation. Shapiro (1995) describes EMDR as a structured, multicomponent treatment package that incorporates the following eight stages:

1. *Patient history and treatment planning.* In this phase, the clinician thoroughly evaluates patient readiness, barriers to treatment (which may include secondary gains from the maintenance of the trauma-related pathology), dysfunctional behaviors, symptoms, and illness characteristics. The clinician then identifies suitable trauma memories ("targets") as foci for treatment. The EMDR treatment plan addresses not only the trauma-specific memories implicated in the psychopathology, but also present reminders of the traumatic event. It also seeks to identify remedial skills and behaviors for the patient's future use.

2. *Preparation.* This stage is used to establish an appropriate treatment relationship, provide education about trauma, inform the patient of the rationale behind EMDR, teach specific coping skills for processing trauma-related material as it emerges, and assist the patient in learning to maintain perspective in the face of trauma reactivation.

3. *Assessment.* In this stage, the patient is asked to bring together the components of the traumatic memory in a structured manner. This process includes (a) identifying a distressing image in memory, (b) identifying an associated negative cognition, (c) identifying an alternate positive cognition, (d) rating the validity of the positive cognition (VoC) using a 7-point scale, (e) identifying the emotions associated with the traumatic memory, (f) rating the subjective level (or units) of disturbance (SUD) using an 11-point scale, and (g) identifying trauma-related physical sensations and their bodily location (e.g., a flutter in the stomach).

For example, a rape victim with PTSD might generate an unpleasant mental image of the rape and the thought, "It's my fault." Next, the patient might identify an alternate positive cognition such as, "I did the best I could under the circumstances." The patient would then rate the felt "truth" of this positive cognition on the VoC scale. Next, the patient might identify emotions of fear and anger. The intensity of these and other emotions elicited by the target memory would be assessed via the SUD scale. Then, the client might note that palpitations and a choking feeling are the primary sensations associated with the traumatic memory. In preparation for skills building, the patient might note that becoming more able to say "no" might help her avoid future, dangerous situations.

4. *Desensitization and reprocessing.* During this critical stage of treatment, the patient is initially asked to hold in mind the disturbing image, the negative cognition, and the bodily sensations associated with the traumatic memory. The clinician moves his or her fingers back and forth, approximately 12 inches in front of the patient's face, while the patient tracks the moving fingers with his or her eyes. Procedural alternatives to using the eye movements include other stimulation, such as auditory tones or hand taps. After approximately 20 back-and-forth eye movements, the clinician stops and asks the patient to let go of the memory, take a deep breath, and provide feedback about any changes in the image, bodily sensations, emotions, or thoughts about the self. Often, patients will report the emergence of new memories, emotions, sensations, or cognitions. After each set of eye movements (or other stimulation), depending on the patient's response, the therapist instructs the patient on what to attend to next. Usually, minimum direction by the therapist is recommended; however, in some instances, where processing of the traumatic memory appears blocked, the therapist may be required to intervene with procedural variations intended to support cognitive and/or emotional change.

5. *Installation of positive cognition.* Once the SUD rating has been reduced as far as possible toward zero (no discomfort), the positive cognition described in Stage 4 is again assessed using the VoC scale. The patient is instructed to think of the target image while covertly rehearsing the positive cognition. Another set of eye movements is performed, followed by another assessment of the validity of the positive cognition. This cycle is repeated until the VoC rating rises as far as possible toward 7 (completely valid). Specific coping skills designed to deal with past memories and present emotions, as well as optimal behavioral responses to future situations (e.g., saying "no" to undesired advances from men in the case of the hypothetical rape victim) may also be rehearsed within the EMDR framework (Shapiro, 1995).

6. *Body scan.* In this stage, the patient is asked to check for any signs of residual physical tension or discomfort. If such are reported, they are taken to be indicators of incomplete trauma processing. The patient is then instructed to attend to the physical sensations while additional sets of eye movements are performed.

7. *Closure.* This stage is designed to prepare the patient for leaving each session. Because the activation of traumatic memories can provoke strong emotions, techniques such as relaxation or visualization are occasionally used to help the patient reach closure. The patient is encouraged to keep a journal of feelings, thoughts, and dreams related to the trauma in between sessions and to utilize self-control techniques.

8. *Reevaluation.* Each subsequent session incorporates an assessment of whether treatment goals have been reached and maintained. Trauma-related material that has emerged since the last session may be addressed. Additional sessions are scheduled as needed to address trauma memories, current reminders, and skills development.

EMDR TREATMENT EFFICACY

This section reviews the empirical literature bearing on the efficacy of EMDR as a treatment for PTSD. Other recent reviews include Feske (1998), Lohr, Tolin, and Lilienfeld (1998), Shapiro (1996), and Spector and Read (1999). The articles reviewed here were identified via literature searches on PsycLIT, PsycINFO, PILOTS, and MEDLINE. We also searched the reference lists in relevant publications. The relatively large number of studies conducted to date on the efficacy of EMDR enabled us to select those that met many of Foa and Meadows's (1997) "gold standard" criteria for treatment studies. Accordingly, we used the following criteria for inclusion in this review:

1. The study was published (or in press) in a peer-reviewed journal. This criterion excluded, for example, the study of Boudewyns, Stwertka, Hyer, Albrecht, and Sperr (1993).

2. The study employed a control condition that allowed differentiation of specific effects of the treatment from nonspecific effects due to the passage of time or the performance of repeated assessments (Mahoney, 1978). This criterion excluded, for example, open trials by Forbes, Creamer, and Rycroft (1994) and Lazrove, Triffleman, Kite, McGlashan, and Rounsaville (1998).

3. The study employed random assignment to the EMDR or control condition. This criterion excluded, for example, the study of Devilly and Spence (1999). Although the authors characterized their procedure as "stratified randomization," treatment was provided in blocks, with the majority of the non-EMDR patients treated in the first block, and the majority of the EMDR patients treated in the second block. This represents a substantial departure from standard randomization strategies. An earlier study by Devilly, Spence, and Rapee (1998) also employed stratified randomization. However, because the potentially confounding recruitment heterogeneities and treatment order effects introduced by the subject blocking in the earlier study were less dramatic than in the later study, the earlier study is included in this review. Also excluded was a multiple-baseline dismantling study by Montgomery and Ayllon (1994) that treated subjects first in a non-eye-movement condition, followed by an eye-movement condition.

4. The dependent variables included at least one standard measure of PTSD symptoms. This resulted in the exclusion, for example, of studies by Shapiro (1989) and Silver, Brooks, and Obenchain (1995), as well as a dismantling study by Wilson, Silver, Covi, and Foster (1996).

Table 7.1 provides additional details regarding the studies reviewed here, including control conditions, samples, session number and duration, outcome measures, effect sizes, and comments. Table 7.1 also provides a key for outcome measure abbreviations used there and in the following text.

TABLE 7.1. EMDR Treatment Studies Reviewed

Study	Treatments	Sample	No./duration of session	Outcome measures	Effect sizes (g)	Comments
covering "Studies of EMDR versus wait list (or continuing standard care)"						
Jensen (1994)	1. EMDR 2. SC	25 male combat veterans with PTSD	1. 2 sessions, 50 min	SI-PTSD[1], MISS[2]	Post-tx: EMDR vs. SC = 0.97[1], −0.36[2]	a, b, d, f, g
Wilson, Becker, & Tinker (1995)	1. EMDR 2. Wait list	40 male and 40 female civilians, 46% PTSD	1. 3 sessions, 90 min	IES-int[1], IES-avd[2]	Post-tx: EMDR vs. WL = 1.32[1], 1.01[2]	
Rothbaum (1997)	1. EMDR 2. Wait list	18 female rape victims with PTSD	1. 3 sessions, 90 min	PSS-I[1], IES-int[2], IES-avd[3]	Post-tx: EMDR vs. WL = 2.68[1], 2.19[2], 2.70[3]	e
Chemtob, Nakashima, Hamada, & Carlson (in press)	1. EMDR 2. Wait list	32 male and female children with PTSD	1. 3 sessions, 40 min	CSI[1]	Post-tx: EMDR vs. WL = 1.29[1]	f
covering "Studies of EMDR versus other treatment (or newly initiated standard care)"						
Vaughan et al. (1994)	1. EMD 2. IHT 3. AMT	13 male and 23 female civilians, 78% PTSD	1. 3–5 sessions, 50 min 2. 3–5 sessions, 50 min, with homework 3. 3–5 sessions, 50 min, with homework	SI-PTSD[1], IES-int[2], IES-avd[3]	Post-tx: EMD vs. IHT = 0.70[1], 0.71[2], −0.33 [3] EMD vs. AMT = 0.62[1], 1.03[2], 0.14 [3] Follow-up: EMD vs. IHT = 0.43[1], −0.02[2], 0.35 [3] EMD vs. AMT = 0.42[1], 0.30[2], 0.47 [3]	a

144

Study	Conditions	Sample	Treatment	Measures	Results	
Carlson, Chemtob, Rusnak, Hedlund, & Muraoka (1998)	1. EMDR 2. BF-REL 3. SC	35 male combat veterans with PTSD	1. 12 sessions, 60–75 min 2. 12 sessions, 40 min, with homework	MISS[1], IES-int[2], IES-avd[3], CAPS-freq[4], CAPS-intsy[5]	Post-tx: EMDR vs. BF-REL = 1.08[1], 0.47[2], 0.36[3] EMDR vs. SC = 0.91[1], 0.41[2], 0.02[3] Follow-up: EMDR vs. BF-REL = 0.97[1], 0.70[2], 0.90[3], 1.90[4], 1.88[5]	
Marcus, Marquis, & Sakai (1997)	1. EMDR 2. SC	14 male and 53 female civilians with PTSD	1. 6 sessions, 50 min	MISS[1], IES[2]	Post-tx: EMDR vs. SC = 0.75[1], 0.92[2]	g
Scheck, Schaeffer, & Gillette (1998)	1. EMDR 2. AL	60 young women, 77% PTSD	1. 2 sessions, 90 min 2. 2 sessions, 90 min	IES[1], PENN[2]	Post-tx: EMDR vs. AL = 0.75[1], 0.71[2]	h

Dismantling studies controlling for eye movements

Study	Conditions	Sample	Treatment	Measures	Results	
Renfrey & Spates (1994)	1. EMDR 2. Automated EMDR 3. EMDR –EM	5 male and 18 female civilians, 91% PTSD	1. 2–6 sessions, unknown duration 2. 2–6 sessions, unknown duration 3. 2–6 sessions, unknown duration	CAPS, IES, Phys	Insufficient information	a, g
Boudewyns & Hyer (1996)	1. EMDR + SC 2. (EMDR– EM) + SC 3. SC	61 male combat veterans with PTSD	1. 5–7 sessions, unknown duration 2. 5–7 sessions, unknown duration	CAPS, IES, Phys	Insufficient information	b, d

TABLE 7.1. *(continued)*

Study	Treatments	Sample	No./duration of session	Outcome measures	Effect sizes (g)	Comments
		Dismantling studies controlling for eye movements				
Pitman et al. (1996)	1. EMDR 2. (EMDR – EM)	17 male combat veterans with PTSD	1. 6 sessions, 70–110 min 2. 6 sessions, 70–110 min	CAPS[1], MISS[2], IES-int[3], IES-avd[4]	Post-tx: EMDR vs. (EMDR – EM) = –0.03[1], 0.14[2], 0.11[3] –0.02[4] Follow-up: EMDR vs. (EMDR – EM) = 0.19[1], 0.22[2], 0.39[3], 0.14[4]	a, b, d
Devilly, Spence, & Rapee (1998)	1. EMDR + SC 2. (EMDR – EM) + SC 3. SC	51 male combat veterans with PTSD	1. 2 sessions, 90 min 2. 2 sessions, 90 min	MISS[1]	Post-tx: (EMDR + SC) vs. [(EMDR – EM) + SC] = 0.31[1] (EMDR + SC) vs. SC = 0.03[1] Follow-up: (EMDR + SC) vs. [(EMDR – EM) + SC] = 0.25[1]	b, c, d, e, h

Note. Effect sizes are given as Hedges's unbiased *g* and represent the magnitude of the difference between the EMDR and control group at the posttreatment (and in some studies follow-up) assessment. Positive effect sizes indicate that the EMDR group was less symptomatic than control group at the time of the assessment; negative effect sizes indicate the opposite. *Treatments*: EMDR, eye movement desensitization and reprocessing; WL, wait list; SC, standard care; BF-REL, biofeedback-assisted relaxation; AMT, applied muscle relaxation training; AL, active listening; IHT, imagery habituation training. *Standardized PTSD outcome measures*: SI-PTSD, Structured Interview for PTSD; PSS-I, PTSD Symptom Scale—Interviewer Version; PTSD-I, PTSD Interview; CAPS, Clinician-Administered PTSD Scale; freq, frequency; intsty, intensity; MISS, Mississippi Scale for PTSD; IES, Impact of Event Scale; int, intrusion; avd, avoidance; PENN, Penn Inventory for PTSD; CSI, Childhood Symptom Inventory. (See respective studies in text for references.) *Comments*: a–d, Interpretation of negative results limited by a, small samples; b, treatment-refractory participants; c, questionable randomization; d, questionably adequate treatment dosage duration, and/or fidelity; e, single therapist; f, missing or incomplete baseline assessment; g, nonblind outcome evaluator(s); h, some outcome assessments by telephone or mail.

146

The reviewed studies are divided into two categories: those that employed a wait-list control, and those that employed control treatments. Included in the wait-list category are studies in which the control group received continuing standard care. A limitation of these studies is that they do not control for the possibility of nonspecific effects due to a newly introduced treatment. Included in the control treatment category are studies in which the control group received newly initiated (as opposed to continuing) standard care.

Studies Employing a Wait-List (or Continuing Standard Care) Control

Jensen (1994) studied 25 male Vietnam combat veterans with PTSD who were receiving psychiatric services at a VA Medical Center. Thirteen were selected to receive two sessions of EMDR in addition to their current treatment. Neither group showed significant symptom reductions following treatment; in fact, both groups worsened somewhat. As noted in the "Comments" column of Table 7.1, this study suffered from several limitations (e.g., a treatment refractory sample and inexperienced therapists).

Wilson, Becker, and Tinker (1995) assigned 40 male and 40 female trauma survivors of diverse, mainly civilian, traumatic events to three sessions of EMDR or wait list. Wait-list participants subsequently received EMDR. Results indicated that patients who received EMDR improved on all measures, particularly those that reflected trauma-related symptoms, whereas wait-list patients did not. Pre–post effect sizes were large and continued to improve at follow-up for five of the nine measures. This study's participants were largely single-event trauma survivors, which limits generalizability of the results to patients with multiple traumas. A 15-month follow-up study of 66 of the original participants treated with EMDR (Wilson, Becker, & Tinker, 1997) indicated that treatment gains were maintained. Eighty-four percent of participants who originally had PTSD no longer met criteria for this disorder after only three EMDR sessions.

Rothbaum (1997) assigned 18 female rape victims with PTSD to either three sessions of EMDR or wait list. Patients treated with EMDR showed a greater decrease in trauma-related symptoms than did wait-list patients, with very large effect sizes. At posttreatment, 90% of EMDR patients, compared to 12% of wait-list patients, no longer met criteria for PTSD.

Using a lagged-groups design, Chemtob, Nakashima, Hamada, and Carlson (in press) evaluated the efficacy of EMDR for 32 elementary-school-age children meeting criteria for PTSD 3 years after a catastrophic hurricane. EMDR resulted in substantial reductions in scores on the Children's Reaction Inventory (CRI), which was employed as a structured interview, as well as significant but lesser reductions in depressive and anxiety symptoms. Gains were maintained at 6-month follow-up. Health visits to the school

nurse were also significantly reduced following successful treatment with EMDR.

Studies Employing Control Treatments (or Newly Initiated Standard Care)

Vaughan and colleagues (1994) compared EMDR to two other treatments in 36 trauma victims. Seventeen participants were first chosen for a wait list. All participants were then assigned to one of three treatment conditions: EMDR, imagery habituation training (IHT), or applied muscle relaxation training (AMT). The last two therapies, but not EMDR, included daily homework between sessions. All active treatment groups improved significantly compared to the wait list at both posttreatment and follow-up. There were no group differences with regard to improvement in total PTSD symptoms. However, only EMDR produced significant improvement in flashbacks and nightmares. This finding was reinforced by superior results for EMDR on the Impact of Event Scale (IES) intrusion subscale at posttreatment; at follow-up, EMDR produced further improvement on this subscale, but its significant superiority was lost due to improvement in the two other groups.

Marcus, Marquis, and Sakai (1997) conducted a study of PTSD treatment in 67 patients being seen in a large health maintenance organization (HMO). Help-seeking patients who had not previously received PTSD treatment were referred for evaluation. Following assessment, patients meeting diagnostic criteria for PTSD were assigned to EMDR or standard clinical care, which included individual treatment, medication, and/or group therapy. Patients in both groups received medications, day treatment, and hospitalization as needed. The design did not predetermine the number of sessions in either treatment condition, which permitted the authors to consider the number of sessions received as a health care utilization outcome variable. Results indicated that patients who received EMDR showed significantly faster and greater improvement on measures of PTSD, depression, and anxiety. At posttreatment, 77% of EMDR patients no longer met criteria for PTSD compared to 50% in the standard care condition. EMDR patients used fewer supplementary treatment and medication management sessions than did standard care patients.

Scheck, Schaeffer, and Gillette (1998) assigned 60 young women exhibiting traumatic memories and dysfunctional behavior, such as promiscuity and running away from home, to two sessions of either EMDR or Rogerian active listening (AL), administered by different groups of therapists. There was statistically significant improvement on all measures for both treatment conditions. At posttreatment, the EMDR group showed lower symptom severity than did the AL group on four of the five measures employed. Although AL was efficacious in reducing symptoms, the effect size for EMDR was twice as large.

Carlson, Chemtob, Rusnak, Hedlund, and Muraoka (1998) assigned 35 male combat-veteran outpatients to standard care only, 12 sessions of biofeedback-assisted relaxation, or 12 sessions of EMDR. At posttreatment, the EMDR group showed significantly greater symptom reduction than the other two groups. Physiological arousal decreased following treatment, but there were no group differences. At 3-month follow-up, the standard care group was no longer in the study, but the EMDR group continued to show lower symptoms than the biofeedback-assisted relaxation group. At 9-month follow-up, 90% of the EMDR, but only 46% of the biofeedback, participants were retained. The EMDR group continued to show lower symptoms than did the biofeedback group on most measures. Seventy-five percent of EMDR-treated participants no longer met criteria for PTSD at 9-month follow-up. Evaluators rated the EMDR patients as significantly more satisfied with their treatment experience.

In closing this review of controlled efficacy studies, a perusal of the effect sizes of EMDR versus control treatments in Table 7.1 reveals that nearly all are positive and many are large.

DISMANTLING STUDIES EXPLORING THE ROLE OF EYE MOVEMENTS

The contribution of eye movements to EMDR's effects has been the subject of speculation, critical review, and several controlled studies since the introduction of the procedure by Shapiro (1989), who initially proposed a central role for eye movements performed while the patient concentrated on the memory to be desensitized. In order to evaluate the specific effect of the eye movements on treatment outcome, several "dismantling" studies have been conducted comparing procedures that adhere to the EMDR protocol to varying degrees with control procedures that replace eye movements with patients' either closing their eyes or focusing their gaze on a nonmoving target.

Renfrey and Spates (1994) assigned 5 male and 18 female civilians with intrusive PTSD symptoms, all but two of which met criteria for PTSD, to one of three treatment conditions: EMD ($n = 8$), a protocol employing eye movements induced by left–right–left flashing lights ($n = 8$), and a protocol employing active visual attention to a fixed, flashing light ($n = 7$). All groups rehearsed traumatic memories per Shapiro's (1989) original EMD protocol. Between two and six sessions were provided, depending on participants' responses. Although specific supporting data were not reported, all groups showed effects in the direction of improvement on the PTSD outcome measures, with no differences among groups.

In a preliminary report of a study described as in progress, Boudewyns and Hyer (1996) randomly assigned 61 male combat veterans to standard

care only, standard care plus 5–7 sessions of EMDR, or standard care plus 5–7 sessions of an EMDR analogue that was procedurally similar to EMDR, except that patients were asked to keep their eyes closed rather than move them back and forth. On the Clinician-Administered PTSD Scale (CAPS), all three groups' symptoms dropped significantly at posttreatment, with no significant differences among groups. There were also no significant group differences on the IES, which did not significantly change as a function of treatment. Both the EMDR and analogue groups showed significantly lower heart rate responses and less self-reported anxiety after treatment than the standard care group, which actually showed increases.

Devilly, Spence, and Rapee (1998) treated veterans with chronic combat-related PTSD with two sessions of EMDR ($n = 19$), two sessions of a similar procedure in which a fixed, flashing light was substituted for the eye movements ($n = 16$), or standard psychiatric support ($n = 16$). Although all three groups improved on all outcome measures, the EMDR and EMDR analogue groups combined showed more improvement than the standard care group, but they did not differ from each other. At 6-month follow-up, symptoms had reverted to pretreatment levels.

Pitman and colleagues (1996) randomly assigned 17 male outpatient Vietnam combat veterans with PTSD to either EMDR or an identical control condition with fixed (rather than moving) gaze. During the control treatment, the therapist moved his fingers in front of the patient's face, but the patient was instructed not to follow them with his eyes but, instead, to tap a finger of each hand rhythmically. Six sessions of one treatment focusing on a specific combat event were provided, followed by six sessions of the other treatment focusing on another combat event, in a crossover design. Both groups showed modest improvements. There were no differences between EMDR with and without eye movements, except on IES-avoidance, where the eyes-fixed treatment was superior. At 5-year follow-up (Macklin et al., 2000), the improvements had disappeared, and participants did not differ from a previously unstudied group that had not undergone such treatment. In this study, restricting the focus to two clearly delineated traumatic events may have reduced the impact of the treatment procedure on overall PTSD symptoms.

Overall, the studies reviewed here provide little support for the hypothesis that eye movements are critical to the effects of EMDR. However, a final conclusion regarding this issue is precluded by methodological limitations of the various studies (listed under "Comments" in Table 7.1), including treatment refractory subjects, questionably adequate treatment dosage and fidelity, and limited power due to small samples. Kazdin and Bass (1989) discuss the problem of evaluating competing treatments in designs and samples that confer inadequate power, and they specifically note the implication for dismantling studies of psychotherapy. Additional research in designs that rectify these limitations using carefully defined control conditions, establishing high

levels of treatment fidelity, and incorporating large numbers of patients drawn from treatment responsive populations, is indicated.

EFFICACY RATING AND CLINICAL RECOMMENDATIONS

Based upon this review of seven published, randomized, controlled, efficacy studies, we assign EMDR an AHCPR Level A/B rating. The "A" component of this rating means that the reviewed studies found EMDR to be more efficacious for PTSD than wait-list, routine-care, and active-treatment controls. Studies of EMDR treatment have generally yielded large effect sizes. The "B" component of this rating means that additional studies that employ more extensive controls addressing the limitations of studies to date, and that compare EMDR to other focused PTSD treatments, are needed to establish the highest level of confidence in EMDR's efficacy. As might be expected for any treatment, the evidence is stronger for the beneficial effect of EMDR on persons with single-event civilian trauma than on multiply traumatized, treatment refractory, chronically ill war veterans who are often inpatients, substance dependent, compensation seeking, and/or previously unresponsive to treatment.

It is important to distinguish the treatment of a single traumatic memory from the treatment of PTSD. In some early studies, this distinction was not preserved, leading to unrealistic expectations. Accordingly, EMDR dosage (i.e., number of sessions) should be consistent with the complexity of the trauma and the number of traumatic memories.

QUESTIONS IN NEED OF FURTHER RESEARCH

To date, few EMDR studies have benefited from external funding. As a result, the extant studies have been conducted in field settings, resulting in studies with higher external than internal validity. In this sense, EMDR treatment research has not fully matured. For example, EMDR proponents maintain that treatment fidelity strongly influences efficacy. However, most EMDR studies to date have not used sophisticated tools such as multirater evaluations or checklists to assess fidelity. This creates difficulties in interpreting results. Such methodological controls represent the next needed step in evaluating EMDR's efficacy as a treatment for PTSD and are strongly encouraged.

Support for EMDR's therapeutic efficacy does not necessarily imply support either for its underlying theory or for the postulated role of eye movements or other specific EMDR components. On the other hand, the finding that a procedure employing multiple, brief, interrupted exposures to

traumatic material can be efficacious, calls for a reexamination of traditional theoretical notions that prolonged, continuous exposure is required (Eysenck, 1979). Further investigation of such issues promises to deepen our understanding of trauma treatment mechanisms. Additional properly designed dismantling studies also need to be conducted in order to identify what components of EMDR are beneficial. Ideally, such studies should be conducted with patients who are likely to be responsive to treatment (e.g., single trauma, more acute), because it is difficult to compare differences in induced changes in minimally responsive patients.

Comparisons of EMDR with other PTSD treatments in larger samples are indicated. These should not be restricted to efficacy but should also examine other important issues such as treatment efficiency (cf. Marcus, Marquis, & Sakai, 1997), and patient tolerance and comfort (Pitman et al., 1996; see also Cahill & Frueh, 1997), which may be advantages of this therapy. It is also important to determine which patient characteristics predict improvement with which treatment modality. EMDR's efficacy in the treatment of childhood PTSD needs to be investigated further. Finally, an extraordinarily large number of therapists have been trained in EMDR, a highly standardized treatment modality. These therapists represent a potentially valuable resource for mounting large, field-based effectiveness trials of PTSD treatment.

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